Acta Phytotaxonomica Sinica

## 中国蹄盖蕨属的研究Ⅱ ——种的处理(1):

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## A REVISION OF THE CHINESE ATHYRIUM ROTH I ——ENUMERATION OF SPECIES (1)

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**Abstract** About 300 "species" names of *Athyrium* from China were published. They are preliminarily treated as 117 species with a number of varieties and hybrids. The complete enumeration will be reported in four parts. The present paper is part one, a key to the species.

Key words Taxonomy; Pteridophyte; Athyriaceae; Athyrium Roth; China

1. 狗子喜群團形式齒屬形,臺群于美式美見消失而不具展,狗子團廳表面有明息的總額。

**摘要** 已发表的涉及中国的蹄盖蕨属植物的名称有 300 多个, 它们初步被处理为 117 种和一些变种和杂种, 全文将分 4 次报道, 本篇是第一部分: 分种检索表。

关键词 分类学;蕨类植物;蹄盖蕨科;蹄盖蕨属;中国

1997-01-29 收稿。

## 分种检索表

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2. 叶柄及叶轴暗褐色, 密被栗黑色或褐棕色、卵状披针形和线形两种混生的鳞片; 叶下部羽片多对逐
新编辑 双片锚头,叶柄壳较叶片每(组1 星軒篇等素组 Sect 1 Wellichians (X C. Zhang)Z. R.

- 2. 叶柄及叶轴禾秆色或略带淡紫红色,仅在叶柄基部被有较多棕色鳞片;叶下部羽片仅 1~2 对稍缩短,羽片渐尖头;叶柄仅稍短于叶片(组 2. 疏叶蹄盖蕨组 Sect. 2. Dissitifolia(X. C. Zhang)Z. R. Wang)。本组有 2 种。

<sup>\*</sup> 国家自然科学基金(NSFC)39391801 资助课题。 关于"蹄盖蕨属的组系划分",见:王中仁,1997. 中国蹄盖蕨属的研究 I ——属下分类. 植物研究,17(3):235~ 261

- 1. 孢子囊群椭圆、短线、弯钩、马蹄或圆肾等形状;囊群盖宿存,少有残存能见,或至少幼嫩时可见;孢子周壁表面有明显的褶皱或无褶皱。
  - 4. 根状茎细长横走或短横卧; 叶远生或近生, 或根状茎近直立, 但孢子周壁表面有明显的褶皱, 羽片无柄, 基部上侧不呈耳状。(次项 4 见第 319 页)
    - 5.根状茎细长横走;羽轴及小羽片中肋上面有长针刺状突起;孢子周壁表面有明显的褶皱或无褶皱。

- 5. 根状茎长横走或短横卧,或根状茎近直立,但羽片无柄,基部上侧不呈耳状;羽轴及小羽片中肋上面无刺状突起;孢子周壁表面有明显的褶皱(组 4. 日本蹄蓋蕨组 Sect. 4. Niponica Ching et Y. T. Hsieh)。本组有 4 系。
  - 7. 根状茎细长横走; 叶远生(系 1. 苍山蹄盖蕨系 Ser. 1. Biscrrulata Ching et Y. T. Hsieh)。本系有 3 种。
    - 8. 叶一型, 叶柄较叶片短或等长; 叶片卵状长圆形; 侧生羽片 15~20 对; 基部一对羽片缩短, 羽轴下侧的裂片和上侧的近等长。
    - 6. 乌蒙山蹄盖蕨 A. wumonshanenicum Ching 8. 叶近二型,不育叶的叶柄较叶片短,能育叶的叶柄远较叶片长;叶片三角状卵形,侧生羽片 3

- 7. 根状茎短横卧(偶兼有细长地下匍匐茎);叶近生,或根状茎近直立,但羽片无柄,基部上侧不呈耳状。
  - 10.叶片卵形至长卵形,顶部急缩,下部羽片仅 1~2 对稍缩短,羽片有柄,叶柄仅稍短于叶片;叶柄基部鳞片淡棕色;孢囊群短线形、长圆形或长弯钩形(系 2. 日本蹄盖蕨系 Ser. 2. Niponica Ching et Y. T. Hsieh emend. Z. R. Wang)。本系有 2 种。

相连。产云南 ············ 9. 中缅蹄盖蕨 A. brevisorum (Wall. ex Hook.) Moore

- 10. 叶片披针形、长圆状披针形或倒披针形,顶部渐尖,羽片无柄或偶有极短柄(不超过 5 mm);叶柄远较叶片短;叶柄基部鳞片红棕色或栗色;孢子囊群近圆形、椭圆形、圆肾形或短弯钩形。
  - 12. 囊群盖灰白色, 边缘具睫毛, 叶基部羽片多对逐渐缩短或 1~2 对明显缩短; 根状茎短横

卧(系 3. 麦秆蹄盖蕨系 Ser. 3. Fallaciosa Z. R. Wang)。本系有 3 种。

- 13. 羽片的裂片边缘锯齿尖长。
  - - ...... 11. 岩生蹄盖蕨 A. rupicola (Edgew ex Hope) C. Chr.
  - 14. 叶轴和羽轴下面被毛。产四川和云南 ....... 12. 腺毛蹄盖蕨 A. glandulosum Ching
- 12. 囊群盖淡棕色, 全缘, 叶基部羽片不缩短或几不缩短; 根状茎近直立(系 4. 禾秆蹄盖蕨系 Ser. 4. Yokoscentia Z. R. Wang)。本系有 2 种。

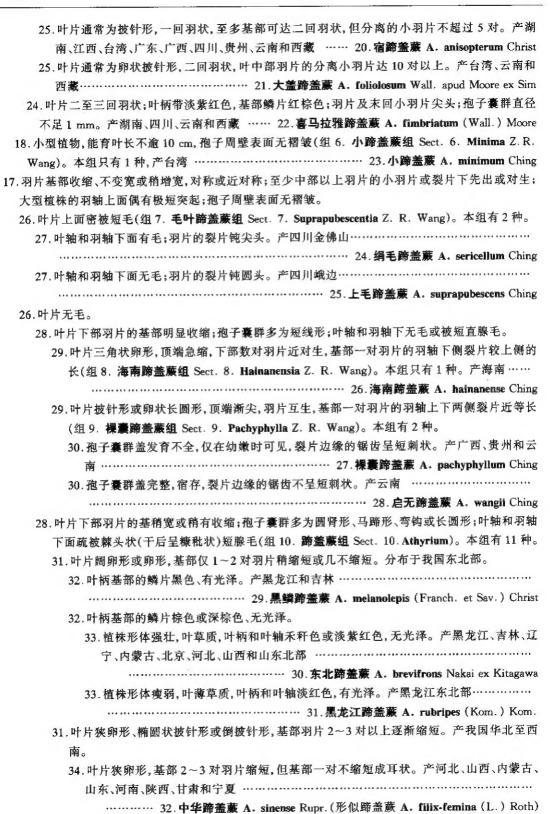
4. 根状茎直立或斜升, 叶簇生。(前项 4 见第 318 页)

有淡棕色单细胞短毛)。

- 16. 羽轴(或小羽轴或中肋)上面无刺状突起,至多在大型植株羽片顶部偶有极短突起,孢子周壁表面有明显的褶皱或无褶皱。(次项 16 见第 321 页)
  - 17. 羽片基部明显增宽,不对称,上侧增大呈耳形,下侧通常楔形;叶片若为一回羽状以上分裂,其裂片或小羽片均为上先出;羽轴上面从无刺状突起;孢子周壁表面有明显的褶皱(偶无褶皱)。 (次项17见第320页)
    - 18. 中型植物,能育叶长在 10 cm 以上,孢子周壁有明显的褶皱(组 5. 耳状蹄盖蕨组 Sect. 5. Polystichoides Ching et Y. T. Hsieh emend. Z. R. Wang)。本组有 8 种。
      - 19. 叶片一回羽状, 羽片边缘波状或具三角形浅裂片; 偶有下部羽片的基部上侧裂片全裂; 叶轴被短腺毛。

        - 20. 羽片尖头, 基部上侧耳片先端有小锯齿, 叶轴疏被棕色短腺毛。产贵州西部 ………
      - - 21. 叶片卵形至阔卵形, 基部一对羽片最大, 长卵形, 其基部 1-2 对小羽片稍缩短; 末回小羽片或裂片钝头。产云南和西藏 …… 17. 圆囊蹄盖蕨 A. bucahwangense Ching
        - 21.叶片狭披针形至卵状披针形,基部一对羽片稍缩短,三角状卵形至三角状披针形,其基部小羽片最大;末回小羽片或裂片尖头或钝圆头。
          - 22. 叶轴上面沟内无腺毛。产台湾 ·········· 18. 红柄蹄盖蕨 A. erythropodum Hayata 22. 叶轴上面沟内有腺毛。

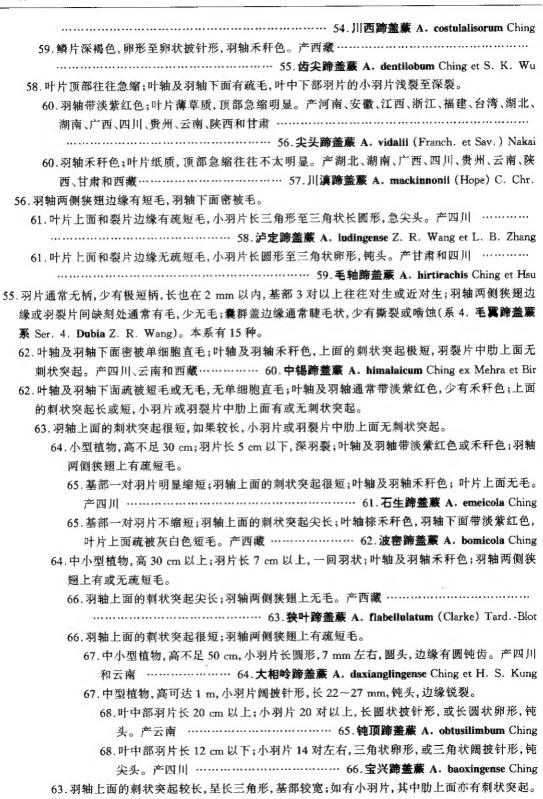
            - 23. 叶纸质或草质,绿色,表面无光泽;囊群盖较大,宿存。
              - 24.叶片一至二回羽状;叶柄禾秆色;基部鳞片棕色或褐棕色;羽片及末回裂片 钝圆头;孢子囊群直径1~2 mm。



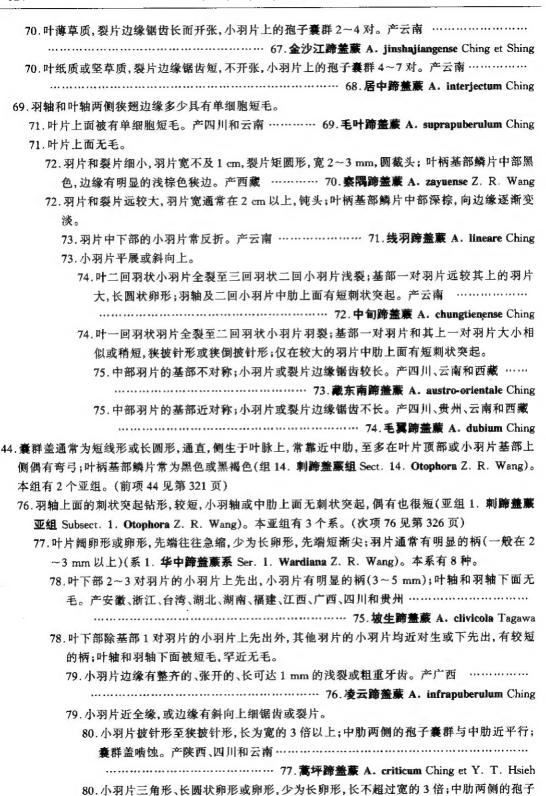
- 34. 叶片椭圆状披针形或倒披针形, 基部 4 对以上羽片逐渐缩短, 基部一对往往缩短呈耳状。分布于我 国秦岭以南至西麓。 35. 叶柄基部鳞片披针形或线状披针形, 宽不逾 1.5 mm, 叶一回羽状, 羽片深羽裂, 裂片边缘有单锯 35. 叶柄基部鳞片卵形或三角状卵形, 宽可达 3~5 mm, 叶通常二回羽状, 小羽片边缘浅裂或有重锯 齿,侧脉通常有2~4个分叉。 36. 叶干后变黑色;叶柄基部鳞片中央栗色,边缘棕色;小羽片先端圆截形。产云南西北部 ……… 36. 叶干后不变黑色;叶柄基部鳞片棕色或暗棕色;小羽片先端钝尖形。 37. 羽片三角状卵形或三角状披针形, 长不超过 3~4 cm, 彼此接近。产四川和西藏 ………… 37. 羽片线状披针形, 长远超过 4 cm, 彼此以间隔分开。 38. 侧生羽片有短柄, 向基部略收缩, 小羽片较长, 长可达 2.5~3 cm。产云南 ………… 38. 侧生羽片无短柄, 向基部不收缩, 小羽片长一般不到 2.5~3 cm。 39. 中部羽片宽约 1 cm, 互相以较宽的间隔(1 倍羽片宽以上)分开。产甘肃、湖北、四川 和云南……………… 37. 疏羽畸盖蕨 A. nephrodioldes (Bak.) Christ 39. 中部羽片宽 1 cm 以上, 互相以一般间隔(远比羽片窄)分开。 40. 羽片较短、狭, 长 3~6 cm, 宽不超过 1.8 cm, 明显斜向上伸展。产四川 ………… ...... 38.斜羽蹄盖蕨 A. adscendens Ching 40.羽片较长、宽,平展或稍斜展。产甘肃、四川、贵州、云南和西藏…………… ....... 39. 希陶篩盞菔 A. dentigerum (Wall. ex Clarke) Mehra et Bir 16. 羽轴(或连同小羽轴、中肋)上面或长或短具刺状突起;孢子周壁表面无褶皱。(前项 16 见 319 页) 41,叶片一回羽状,倒披针形,羽片浅裂至深裂,下部羽片多对逐渐缩短,基部一对羽片往往缩短呈耳 形(组 11. 狭基節盖蕨组 Sect. 11. Stenopoda Z. R. Wang)。本组只有 1 种,产云南和西藏 …… 41. 叶片一至三回羽状, 不为倒披针形, 下部羽片不缩短, 或至多一至数对稍缩短, 基部一对羽片从不 缩短成耳形。 42. 叶片狭披针形, 羽片在 20~25 对以上(组 12. 多羽蹄盖蕨组 Sect. 12. Multipinna Z. R. Wang)。本组有2种。 43. 叶长往往不及 35 cm, 一至二回羽状, 裂片边缘有张开的宽锯齿, 羽片中肋上面的刺状突起 43. 叶长可达 35 cm 上, 二回羽状, 裂片边缘有向上的细长锯齿, 羽轴上面的刺状突起较长。产 江西和广西 ...... 42. 长叶蹄盖蕨 A. elongatum Ching 42. 叶片较阔, 不为狭披针形, 羽片在 20~25 对以下。 44. 囊群盖呈弯钩、马蹄、圆肾、椭圆、短线等多种形状, 侧生、横跨或背生于叶脉上; 叶柄基部鳞 片常为黄棕色、棕色或深棕色(组 13. 川滇蹄蓋蕨組 Sect. 13. Mackinnoniana (Ching et Y. T. Hsieh)Z. R. Wang)。本组有 4 系。(次项 44 见第 324 页)
  - 45. 叶中部以上羽片之小羽片或羽裂片上先出, 偶下先出或近对生, 叶轴及羽轴禾秆色, 偶有带淡紫红色, 下面无毛或具极疏毛; 羽轴两侧狭翅边缘或羽裂片间缺刻处无毛(系 1. 湿生蹄盖蕨系 Ser. 1. Devoliana Z. R. Wang)。本系有 9 种。

- 46. 叶中部以上羽片之小羽片或羽裂片上先出, 互生, 或仅基部一对近对生。 47. 羽片(尤其叶片顶部)或小羽片斜向下反折。 48. 叶片一回羽状, 羽片至多羽状深裂, 无柄, 除顶部的平伸外, 全部向下弯弓。产台湾 ……… 48.叶片一至二回羽状,羽片有短柄,通常平伸或斜向上,顶部的向下弯弓;小羽片可达羽状全 裂,斜向下或平伸。 49. 孢子囊群马蹄形, 小羽片披针形, 几无柄。产浙江、福建、江西、广西、四川、贵州、云南和 西藏 ....... 44. 湿生蹄盖蕨 A. devolii Ching 49. 孢子囊群长圆形或弯钩形, 小羽片卵状三角形或长圆形, 有明显柄或基部以狭翅和羽轴 相连。 50. 小羽片卵状三角形, 急尖头, 有明显柄(长约 1 mm)。产浙江庆元 ……………… 47. 羽片(尤其叶片顶部)或小羽片向上伸展或至多近平伸。 51.叶下部羽片互生,至多基部一对近对生;叶轴和羽轴带淡紫红色,上面刺状突起明显,小羽片 中肋上面无刺状突起。产台湾·············· 47. 三回蹄盖蕨 A. tripinnatum Tagawa 51. 叶基部一至多对羽片对生或近对生;叶轴和羽轴禾秆色, 上面的刺状突起极短, 小羽片中肋 上面亦有极短刺状突起。 52. 羽片之基部一对小羽片近对生,叶轴和羽轴下面疏被短柔毛。产浙江、福建、江西、湖南、 52. 羽片之小羽片上先出, 叶轴和羽轴下面光滑无毛。产广西、四川、贵州、云南和西藏…… 46. 叶片中部以上的羽片之小羽片或羽裂片对生或近对生。 53. 小羽片或羽裂片向下反折或略平展。产台湾 ······· 50. 对生蹄盖蕨 A. oppositipinnum Hayata 45. 叶中部以上羽片之小羽片或羽裂片下先出或近对生;叶轴及羽轴通常带淡紫红色,少有禾秆色,下面 有毛:羽轴两侧狭翅边缘或羽裂片间缺刻处有毛或无毛。 54. 囊群盖通常为肾形、圆肾或椭圆形;叶片阔卵形,基部一对羽片最大,顶部渐尖;鳞片黄棕色(系 2. 峨嵋蹄盖蕨系 Ser. 2. Omeiensia Z. R. Wang)。本系只有 1 种。产湖北、湖南、陕西、甘肃、四川 54.囊群盖通常为长圆、弯钩或马蹄形;叶片通常为长圆状卵形,顶部急缩或渐尖,基部一对羽片和第 二对羽片近等大或稍大;鳞片棕色或褐棕色。 55. 羽片有明显的柄,长一般在 2 mm 以上,除基部一对近对生以外,皆为互生;羽轴两侧狭翅边缘 或羽裂片间缺刻处无毛, 罕有毛; 囊群盖边缘近全缘或啮蚀状(系 3. 川滇蹄盖蕨系 Ser. 3. Mackinnoniana Z. R. Wang)。本系有7种。 56. 羽轴两侧狭翅边缘无毛, 叶轴及羽轴无毛或疏被毛。

57. 小羽片卵形至长圆状披针形,尖头。



69. 羽轴和叶轴两侧的狭翅边缘无毛。

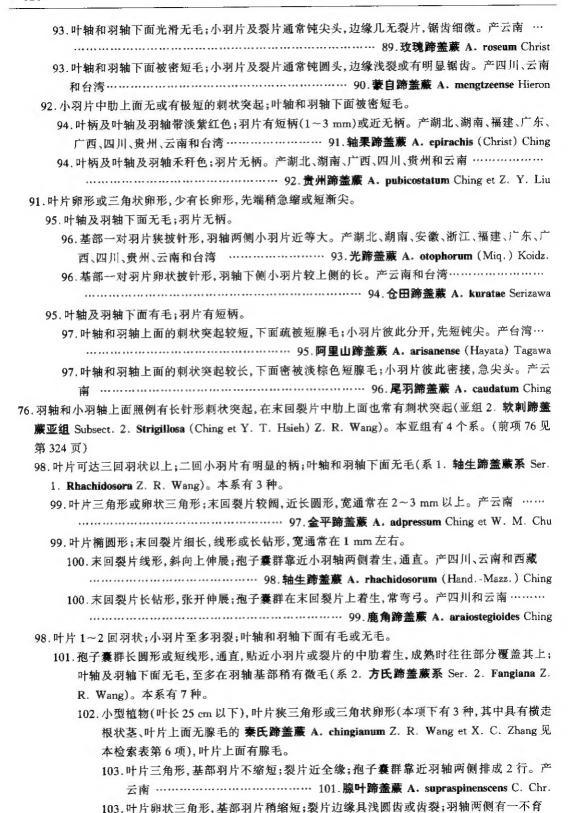


囊群不与中肋平行:囊群盖全缘或近全缘。

81. 叶片三角形或三角状卵形, 除顶部急缩的羽片以外有羽片 5 对左右; 小羽片较阔, 中部宽通常在 5 mm 以上,边缘有锯齿;羽轴下面密被短毛。 82. 叶基部一对羽片的基部最宽, 其下部小羽片最大; 小羽片基部两侧呈耳状。产湖南和贵州 … 82. 叶基部一对羽片的下部小羽片缩短;小羽片基部上侧呈耳状。 83.中部羽片的小羽片斜长方形,边缘仅有细锯齿。产浙江、安徽、福建、江西、湖南、湖北、广西、 四川、贵州和云南 ...... 79.华中蹄盖蕨 A. wardii (Hook.) Makino 81. 叶片狭三角状卵形、长卵形或卵形, 除顶部急缩的羽片以外有羽片 7 对以上; 小羽片较狭, 中部宽 通常在5 mm 以下,近全缘;羽轴下面疏被短毛。 84. 叶卵状长圆形, 先端急缩; 羽片较长(可达 18 cm), 有分离小羽片 10 对以上。产湖南、湖北、陕 84. 叶狭三角状卵形, 顶端渐尖; 羽片较短(5~9 mm), 有分离小羽片 10 对以下。产广西、广东和四 ||| ...... 82. 紫柄蹄盖蕨 A. kenzo-satakei Kurata 77.叶片长圆状卵形或披针形,少有卵形,先端渐尖,少有急缩;羽片通常无柄,或有极短柄(长不及2 mm) 85. 小羽片或裂片圆钝头或截头,边缘有圆形浅裂片或波状齿;中肋两边囊群之间的间隔通常宽于囊 群到叶边缘的距离(系 2. 中越蹄蓋蕨系 Ser. 2. Christenseniana Z. R. Wang)。本系只有 1 种,产 85. 小羽片或裂片尖头或钝尖头,边缘裂片或锯齿不为圆形波状;中肋两边囊群之间的间隔通常窄于 囊群到叶边缘的距离(系 3. 刺蹄蓋蕨系 Ser. 3. Otophora Z. R. Wang)。本系有 13 种。 86. 羽片基部一对小羽片覆盖叶轴。 87. 羽片新尖头; 小羽片钝头, 边缘锯齿张开。产广西、四川、贵州和云南 ……………… ...... 84. 超轴蹄盖蕨 A. delavayi Christ 87. 羽片尾状渐尖头; 小羽片尖头或钝尖头, 边缘锯齿斜向上。 88.羽片较长(14~16 cm), 顶部尾状长渐尖;小羽片短渐尖头,基部上侧有较长的耳状突 起,中肋上面无刺状突起。产四川和湖南········ 85.长尾蹄盖蕨 A. caudiforme Ching 88. 羽片较短(10~12 cm), 顶部短尾状; 小羽片尖头, 基部上侧耳状突起圆头较短, 中肋上 面有刺状突起。产台湾 ........... 86. 姬蹄盖蕨 A. subrigescens (Hayata) Hayata ex Ito 86. 羽片基部一对小羽片不覆盖叶轴。 89.叶柄基部的鳞片卵状披针形或披针形;中部以上羽片之小羽片上先出或近对生;孢子囊群 89.叶柄基部的鳞片线形至线状披针形;中部以上羽片之小羽片下先出或近对生;孢子囊群较 长(长 1.5 mm 以上), 在羽片或小羽片上呈八字形排列。 90. 羽片往往有短柄;小羽片狭长圆形,基部阔楔形;羽轴及叶轴顶部上面的刺状突起极短。 产云南 ...... 88. 同形蹄盖蕨 A. uniforme Ching 90. 羽片无柄或有极短柄: 小羽片不为狭长圆形, 基部下侧楔形, 上侧截形和羽轴平行; 羽轴 及叶轴顶部上面的刺状突起明显。

92. 小羽片中肋上面有明显的刺状突起;叶轴和羽轴下面被密短毛或无毛。

91. 叶片狭卵形或披针形, 先端渐尖。



带。产西藏 ...... 102. 墨脱蹄盖蕨 A. medogense X. C. Zhang 102. 中型植物(叶长 30 cm 以上), 叶片阔卵形至线状披针形;叶片上面无腺毛。 104. 叶一回羽状;羽片三角状披针形,长不及 3.5 cm, 至多羽状全裂, 裂片密接。产云南 …… ...... 103. 俞氏蹄盖蕨 A. yui Ching 104. 叶二回羽状;羽片披针形或线状披针形,长 5~20 cm, 小羽片彼此分开。 105. 叶片卵形至长圆状披针形; 末回裂片边缘几无齿或仅有细小锯齿。产四川和云南… ...... 104. 方氏蹄盖蕨 A. fangii Ching 105. 叶片阔卵形至卵形; 末回裂片边缘有明显的长锯齿或短锯齿。 106.羽片 13~16 对;小羽片斜长方形;叶轴和羽轴下面光滑。产云南和西藏 ……… ...... 105. **聂拉木蹄盖蕨 A. nyelamense** Y. T. Hsieh et Z. R. Wang 106. 羽片 6~7 对;小羽片倒卵形或长圆形;叶轴和羽轴下面密被柔毛。产云南 …… ...... 106. 元阳蹄盖蕨 A. yuanyangense Y. T. Hsieh et W. M. Chu 101. 孢子囊群弯弓或通直, 不贴近小羽片或裂片的中肋着生, 成熟时不覆盖其上; 叶轴及羽轴下面被短 毛,罕无毛。 107. 叶片披针形至线状披针形;分离羽片通常在18 对以上;叶轴近顶部通常有芽胞,偶无(系3. 软 刺蹄盖蕨系 Ser. 3. Strigillosa Z. R. Wang)。本系有3种。 108.叶片狭披针形至线状披针形;下部有多对羽片缩短;羽片较短(3~4 cm),几无柄,其裂片 在 10 对以下,边缘仅有小锯齿;叶轴上部的芽胞常较大。产贵州和云南…………… ...... 107. 芽胞糖糖蒽 A. clarket Bedd. 108.叶片披针形至狭披针形;基部仅1~2 对羽片稍有缩短;羽片较长(6~11 cm),常有短柄, 其裂片在 10 对以上,边缘有重锯齿或裂片;叶轴上部的芽胞较小。 109. 小羽片三角状阔披针形;边缘的浅裂片上仅有细微锯齿。产湖南、江西、广东、广西、 四川、贵州和云南 ························ 108. 胎生篩盖蕨 A. viviparum Christ 109. 小羽片卵状长圆形;边缘的浅裂片上有长约1 mm 的尖锯齿。产湖南、江西、广东、广 ...... 109. 软刺蹄盖蕨 A. strigillosum (Moore ex Lowe) Moore ex Salom 107. 叶片阔卵形、卵形或披针形;分离羽片不超过 15 对;叶轴近顶部通常无芽胞,偶有(系 4. 长江 蹄盖蕨系 Ser. 4. Iseana Z. R. Wang)。本系有8种。 110. 小型植物, 高不超过 30 cm; 叶片披针形, 宽不足 6 cm; 羽片狭小, 宽不及 1 cm; 孢子囊群着 生于小脉基部。产云南、西藏和台湾 ········· 110. 黑足蹄盖蕨 A. nigripes (Bl.) Moore 110. 中型植物, 高通常在 30 cm 以上;叶片阔卵形或卵形, 宽在 6 cm 以上;羽片宽在 1 cm 以上; 孢子囊群着生于小脉中部或中下部。 111. 小羽片浅裂至中裂, 罕达深裂, 钝圆头, 边缘有钝锯齿; 他子囊群通直; 叶干后纸质。 112. 叶片长圆状卵形;下部数对羽片对生或近对生;叶柄及叶轴禾秆色。产云南和贵 州 ....... 111. 广南蹄盖蕨 A. guangnanense Ching 112. 叶片近 : 角形;除基部 · 对近对生外, 羽片互生;叶柄及叶轴通常带淡紫红色。 产广西、四川、云南和台湾 ················· 112. 高山蹄盖蕨 A. silvicola Tagawa 111. 小羽片中裂至全裂, 尖头或钝尖头, 边缘有尖锯齿; 孢子囊群有直有弯或通直; 叶十后 草质。 113. 叶片阔卵形或卵形;小羽片、裂片彼此接近;小羽片长圆状卵形至长三角状卵形,

中肋左右近对称: 孢子囊群通直、很少弯弓; 叶轴近顶部无芽胞。

114. 叶柄和叶轴带淡紫红色, 质脆易折; 羽轴下面被密短毛。产四川和贵州
113. 密羽蹄盖蕨 A. imbricatum Christ
114. 叶柄和叶轴禾秆色, 质较坚实;羽轴下面无毛。
115. 叶柄通常比叶片长;叶片卵形,先端急缩;羽片不足10对。产云南 ···················
115. 叶柄通常比叶片短;叶片长圆形,先端渐尖;羽片 13 对左右。产湖南
113. 叶片卵形至狭卵形, 少有披针形; 小羽片、裂片彼此离开; 小羽片长圆状卵形, 中肋左右显著不对称;
孢子囊群有直有弯多种形状;叶轴近顶部往往有芽胞。
116. 叶片中部羽片的小羽片上先出。产台湾、浙江、湖南、湖北、广西和贵州
116.叶片中部羽片的小羽片近对生。产江苏、浙江、安徽、福建、台湾、江西、湖南、湖北、广西、广东、
四川、贵州、云南和西藏 ······ 117. 长江蹄盖蕨 A. iseanum Ros.
Key to the species
1. Sori rotund or elliptic, exindusiate or indusia caducous; spore perispore with prominent folds on the surface.
2. Petioles and raches dark brown, bearing throughout dense castaneous black or dark brown, mixed scales
of ovate-lanceolate and fibrous ones; basalpinnae gradually shortened towards base; pinna apex obtus;
petioles far shorter than laminae(Sect. 1. Wallichiana (X. C. Zhang) Z. R. Wang). Only one species
included. In Northwest Yunnan, West Sichuan and Southeast Xizang 1. A. wallichianum Ching
2. Petioles and raches stramineous or pale purplish red, bearing more brown scales only at the base; only 1~
2 pairs of basal pinnae slightly shortened; petioles slightly shorter than laminae; pinna apex acuminate
(Sect. 2. Dissitifolia (X. C. Zhang) Z. R. Wang). 2 species included.
3. Laminae pinnate; pinnae pinnatilobate to pinnatipartite, occasionally bipinnate, sessile or subsessile
(stipes less than 3 mm long); teeth short and spread. In Hunan, Guangxi, Sichuan, Guizhou and
Yunnan 2. A. dissitifolium (Bak.) C. Chr.
3. Laminae bipinnate; pinnae prominently stipitate (stipes may up to more than 10 mm long); teeth long
and obliquely upward. In Northwest Yunnan and Xizang
1. Sori elliptic, short-linear, J-shaped, hippocrepiform or reniform; indusia persistent, occasionally incomplete
but visible, at least when young; spore perispore with or without prominent folds on the surface.
4. Rhizomes long- or short-creeping, fronds distant or approximate, spore perispore with or without folds; if
rhizomes erect, spore perispore with prominent folds; pinnae sessile not auriculate at the acroscopic bases.
5 Rhizomes long-creeping; costae and costules bearing prominent spine-like processes adaxially; spore
perispore with or without folds.
6. Middle sized plant, more than 20 cm high; laminae tripinnate or more times divided, with narrow
wings along costae and costules; sori not close to costae or costules, indusia not overlay costae or cos
tules; spore perispore with prominent folds (Sect. 3. Pectinata (Ching et Y. T. Hsieh) Z R
Wang). Only one species included. In Xizang 4. A. pectinatum (Wall. ex Mett.) Moore
6. Small plant, less than 20 cm high; laminae pinnate, pinnae pinnatipartite; sori close to costae or
costules, indusia often overlay costae or costules; spore perispore without folds. In Northwest Yun-
nan (belonging to Section 14. Subsection 2., Series 2. Fangiana Z. R. Wang)

...... 100. A. chingianum Z. R. Wang et X. C. Zhang

5. Rhizomes long- or short-creeping, or erect, but pinnae sessile not auriculate at the acroscopic bases; costae and costules without processes adaxially; spore perispore with prominent folds on the surface (Sect. 4 Niponica Ching et Y. T. Hsieh). 4 series included. 7 Rhizomes long-creeping; fronds distant (Ser. 1. Biserrulata Ching et Y. T. Hsieh). 3 species included. 8. Laminae monomorphic, petioles shorter than laminae or equal in lenth; laminae ovate oblong; pinnae 15~20 pairs; basal pair of pinnae shortened, basiscopic lobes of costa nearly as long as acroscopic ones. 9. Laminae bipinnate, suprasurface glabrous; teeth not long apiculate. In Yunnan, Sichuan and Xizang ...... 5. A. biserrulatum Christ 9. Laminae tripinnate, suprasurface pubescent; teeth long-apiculate. In Yunnan ...... 6. A. wumonshanenicum Ching 8. Laminae subdimorphic, petioles of sterile frond shorter than laminae, but the one of fertile frond far longer than laminae; laminae deltoid-ovate, pinnae 3~5 pairs; basal pair of pinnae not shortened, basiscopic lobes of costa longer than acroscopic ones. In Yunnan ....... 7. A. ruilicola W. M. Chu 7. Rhizomes short-creeping (occasionally long-creeping), fronds approximate; or rhizomes erect, but pinnae sessile, not auriculate at the acroscopic bases. 10. Laminae ovate to narrowly ovate, cuspidate at apex, only 1~2 pairs of basal pinnae slightly shortened; pinnae stipitate; petioles slightly shorter than laminae; scales at petioles base pale brown; sori short-linear, oblong or long J-shaped (Ser. 2. Niponica Ching et Y. H. Hsieh emend. Z. R. Wang). 2 species included. 11. Pinnae usually pinnate; pinnules ovate, oblong-lanceolate or falciform-lanceolate, shallowly lobed to pinnatipartite, basal pinnules usually shortly stipitate. In Liaoning, Nei Mongol, Beijing, Hebei, Shanxi, Henan, Shandong, Shaanxi, Gansu, Ningxia, Hubei, Hunan, Anhui, Jiangxi, Zhejiang, Jiangsu, Guangxi, Guangdong, Sichuan, Guizhou, Yunnan and Taiwan ..... ...... 8. A. niponicum (Mett.) Hance 11. Pinnae usually pinnatipartite to pinnatisect; lobes falciform-lanceolate, at most shallowly lobed at margin, decurrent at the basiscopic bases and connected with the broad wing of costa. In Yunnan 10 Laminae lanceolate, oblong-lanceolate or oblanceolate, apex acuminate; pinnae sessile or occasionally shortly stipitate (stipe not more than 5 mm long); petioles far shorter than laminae; scales at petiole bases red-brown or castaneous; sori subrotund, elliptic, reniform or short J-shaped. 12. Indusia pallid, ciliated on margin; many pairs of basal pinnae gradually shortened towards the base or only  $1\sim 2$  pairs of them prominently shortened; rhizomes short-creeping (Ser. 3. Fallaciosa Z. R. Wang). 3 species included. 13. Teeth at the lobe margin obtuse. In Heilongjiang, Jilin, Liaoning, Nei Mongol, Beijing, Hebei, Shanxi, Henan, Hubei, Shaanxi, Gansu and Ningxia ..... 10. A. fallaciosum Milde 13. Teeth at the lobe margin sharp and long. 14. Raches and costae glabrous abaxially. In Sichuan, Yunnan and Xizang ...... 14. Raches and costae pubescent abaxially. In Sichuan and Yunnan ..... ...... 12. A. glandulosum Ching

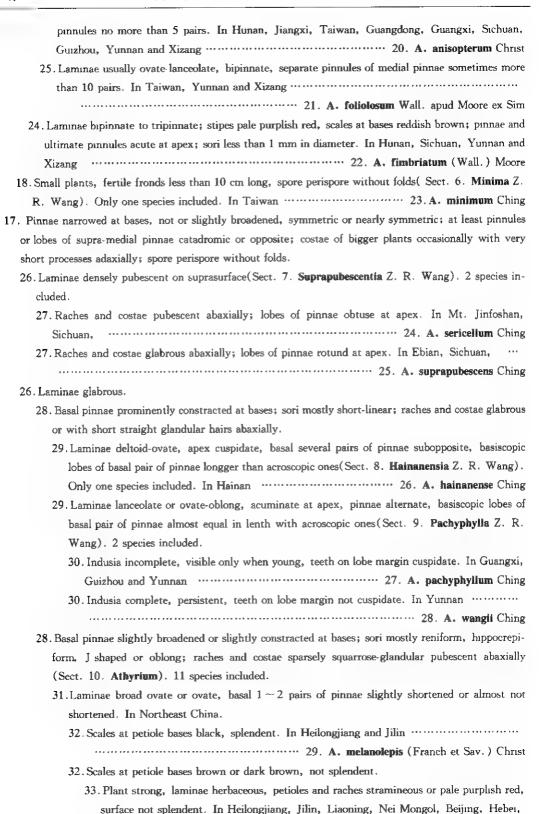
12. Indusia pale brown, entire, basal pinnae not or almost not shortened; rhizomes erect, pinnae sessile not auriculate at the acroscopic bases (Ser. 4. Yokoscentia Z. R. Wang). 2 species included.

- 15. Scales at petiole bases yellow brown, laminae pinnate pinna pinnatipartite to bipinnate pinnule pin natilobate, pinnae narrow, lanceolate. In Heilongjiang, Jilin, Liaoning, Shandong, Anhui, Jiangsu, Zhejiang, Jiangsi, Hunan, Sichuan and Guizhou …… 13. A. yokoscense (Franch. et Sav.) Christ
- 4. Rhizomes erect or ascendent, fronds caespitose.
  - 16. Costae (or costules and midribs) without spine-like processes adaxially, at most on the costa top of bigger plants occasionally with extremely short processes, spore perispore with or without prominent folds.
    - 17. Pinna bases prominently broadened, asymmetric, auriculate at acroscopic bases, usually cuneate at basiscopic bases; when laminae pinnate or more times divided, all lobes or pinnules anadromic; costae without spine-like processes on adaxial surface; spore perispore with prominent folds (occasionally without folds).
      - 18. Middle-sized plants, fertile fronds more than 10 cm long, spore perispore with prominent folds (Sect. 5. Polystichoides Ching et Y. T. Hsieh emend. Z. R. Wang). 8 species included.
        - 19. Laminae pinnate, pinnae margin repand or shallowly deltoid-lobed; acroscopic basal lobes of basal pinnae occasionally pinnatisect; raches glandular pubescent.
        - 19. Laminae pinnate to bipinnate or more times divided, if pinnate, lobes of pinnae not deltoid; raches without glandular hairs (occasionally which pale brown short unicellular hairs).

          - 21. Laminae narrowly lanceolate to ovate-lanceolate, basal pair of pinnae slightly shortened, deltoid-ovate to deltoid-lanceolate, with its basal pair of pinnules biggest; ultimate pinnules or lobes acute or rotund.

            - 22. Raches glandular pubescent adaxially.

              - Laminae papyraceus or herbaceous, green, surface not splendent; indusia bigger, persistent.
                - 24. Laminae pinnate to bipinnate; petioles stramineous, scales at bases brown or dark brown; pinnae and ultimate lobes rotund at apex; sori 1~2 mm in diame ter.
                  - 25. Laminae usually lanceolate, pinnate, at most bipinnate at bases, but separate



33. Plant thin and smaller, laminae thin herbaceous, petioles and raches pale reddish, surface splendent. 31. Laminae narrowly ovate, elliptic-lanceolate or oblanceolate, more than 2~3 pairs of basal pinnae gradu ally shortened. From North to Southwest of China. 34 Laminae narrowly ovate, 2~3 pairs of basal pinnae shortened, but the basal pair of pinnae not shortened to auriculate. In Hebei, Shanxi, Nei Mongol, Shandong, Henan, Shaanxi, Gansu and Ningxia 34. Laminae elliptic-lanceolate or oblanceolate, more than 4 pairs of basal pinnae gradually shortened, the basal pair often shortened to auriculate. From South Qingling to Xizang. 35. Scales at petiole bases lanceolate or linear-lanceolate, less than 1.5 mm wide, laminae pinnatepinnae pinnatipartite, lobe margin serrate, lateral veinlets usually simple. In Sichuan and Yunnan 35. Scales at petiole bases ovate or deltoid-ovate, more than  $3 \sim 5$  mm wide, laminae usually bipinnate, pinnules margin shallowly lobed or biserrate, lateral veinlets usually 2~4 furcate. 36. Laminae black when dry; scales at petiole bases castaneous at medial, brown at margin; pinnule apex rounded-truncate. In Norhtwest Yunnan ...... 34. A. tarulakaense Ching 36. Laminae not black when dry; scales at petiole bases brown or dark brown; pinnule apex obtuse. 37. Pinnae deltoid-ovate or deltoid-lanceolate, less than 3~4 cm long, approximat to each oth-37. Pinnae linear-lanceolate, more than 4 cm long, separae by space from each other. 38. Lateral pinnae shortly stipitate, slightly constructed towards bases, pinnules up to 2.5 38. Lateral pinnae not stipitate, not constructed towards bases, pinnules usually less than  $2.5 \sim 3$  cm long. 39. Middle pinnae about 1 cm wide, with interval wider than pinna. In Gansu, Hubei, 39. Middle pinnae more than 1 cm wide, with interval far narrower than pinna. 40. Pinnae shorter, narrower, 3~6 cm long, less than 1.8 cm wide, prominently 40. Pinnae longger, wider, patent or slightly ascendent. In Gansu, Sichuan, Guizhou, Yunnan and Xizang 16. Costae (sometimes together with costules and midribs) with long or short spine-like processes on adaxial surface; spore perispore without folds on the surface. 41. Laminae pinnate, oblanceolate, pinnae pinnatilobate to pinnatipartite, many pairs of basal pinnae gradually shortened, the basal pair often shortened to auriculate (Sect. 11. Stenopoda Z. R. Wang). Only 

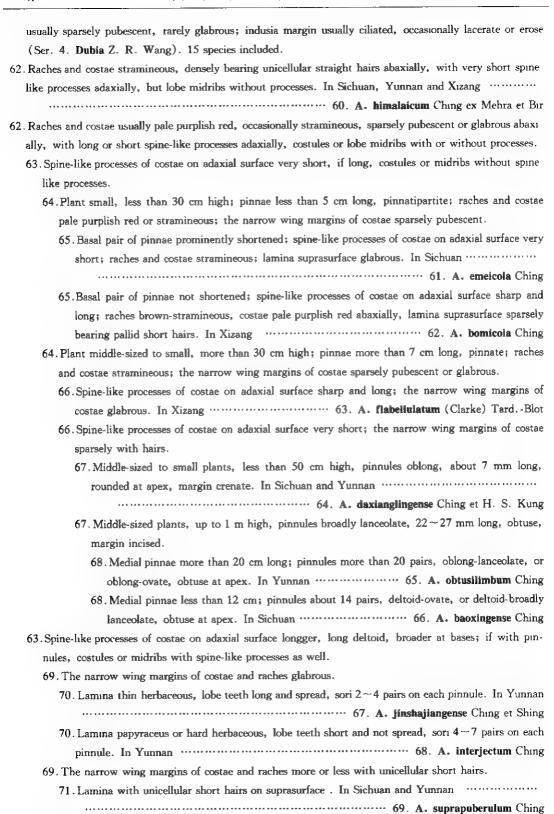
41 Laminae pinnate to tripinnate, not oblanceolate, basal pinnae not shortened, or at most one to several

333

- pairs slightly shortened, but the basal pair never shortened to auriculate.
- 42. Laminae narrowly lanceolate, pinnae more than 20~25 pairs (Sect. 12. Multipinna Z. R. Wang). 2 species included.
  - 43. Laminae often less than 35 cm long, pinnate to bipinnate, lobe margin dentate, costae with short spine-like processes adaxially. In Zhejiang, Hunan, Jiangxi and Guizhou .....
    - ...... 41. A. multipinnum Y. T. Hsieh et Z. R. Wang
  - 43. Laminae up to more than 35 cm long, bipinnate, lobe margin long-serrulate, costae with long spine-like
- 42. Laminae broader, pinnae less than 20~25 pairs.
  - 44. Indusia J-shaped, hippocrepiform, reniform, elliptic, short-linear etc., lateral, across or dorsal on veinlets; scales at petiole bases often yellow-brown, brown or dark brown (Sect. 13. Mackinnoniana (Ching et Y. T. Hsieh) Z. R. Wang). 4 series included.
    - 45. Pinnules or lobes of supra-medial pinnae anadromic, occasionally catadromic or subopposite, raches and costae stramineous, occasionally pale purplish red, glabrous or sparsely pubescent abaxially; the narrow wing margins of costae or the sinus between lobes glabrous (Ser. 1. Devoliana Z. R. Wang). 9 species included.
      - 46. Pinnules or lobes of supra-medial pinnae anadromic, alternate, or only basal pair subopposite.
        - 47. Pinnae (especially the top ones)or pinnules reflexed.
          - 48. Laminae pinnate, pinnae at most pinnatipartite, sessile, reflexed, except the top one patent. In Taiwan ...... 43. A. reflexipinnum Hayata
          - 48. Laminae pinnate to bipinnate, pinnae shortly stipitate, usually patent or ascendent, only the top ones reflexed; pinnules occasionally pinnatisect, reflexed or patent.
            - 49. Sori hippocrepiform, pinnules lanceolate, subsessile. In Zhejiang, Fujian, Jiangxi, Guangxi, Sichuan, Guizhou, Yunnan and Xizang ...... 44. A. devolii Ching
            - 49. Sori oblong or J-shaped; pinnules ovato-deltoid or oblong, prominently stipitate or the bases decursive and connected with the narrow wing of costa.
              - 50. Pinnules ovato-deltoid, acute at apex, prominently stipitate (stipes about 1 mm long). In Zhejiang, Qingyuan ..... 45. A. baishanzuense Ching et Y. T. Hsieh
              - 50. Pinnules oblong, rotund-obtuse at apex, the bases decursive and connected with the narrow wing of costa. In Mt. Maoshan, Zhejiang .....
                - ...... 46. A. maoshanense Ching et P. S. Chiu
        - 47. Pinnae (especially the top ones) or pinnules ascendent or at most nearly patent.
          - 51. Basal pinnae alternate, at most the basal pair subopposite; raches and costae pale purplish red, prominently with spine-like processes adaxially, but costules without processes. In Taiwan 47. A. tripinnatum Tagawa
          - 51. One to several pairs of basal pinnae opposite or subopposite; raches and costae stramineous, with very short spine-like processes adaxially, costules also with processes.
            - 52. The basal pair of pinnules subopposite, raches and costae sparsely pubescent abaxially. In Fujian, Jiangxi, Hunan, Sichuan and Guizhou ..... 48. A. deltoidofrons Makino
            - 52. The basal pinnules anadromic, raches and costae glabrous abaxiolly. In Guangxi, Sichuan, Guizhou, Yunnan and Xizang ... 49. A. delicatulum Ching et S. K. Wu

46. Pinnules or lobes of supra medial pinnae opposite or subopposite. 53. Pinnules or lobes reflexed or nearly patent. In Taiwan ...... 50. A. oppositipinnum Hayata 45. Pinnules or lobes of supra medial pinnae catadromic or subopposite; raches and costae usually pale purplish red, rarely stramineous, pubescens abaxially; the narrow wing margins of costa or the sinus between lobes sparsely pubescent or glabrous. 54. Indusia usually reniform, rotund reniform or elliptic; laminae broad ovate, the basal pair of pinnae biggest, acuminate at apex; scales yellow-brown (Ser. 2. Omeiensia Z. R. Wang). 1 species included. 54. Indusia usually oblong, J-shaped or hippocrepiform; laminae usually oblong-ovate, cuspidate or acuminate at apex, the basal pair of pinnae almost as large as or slightly bigger than the second pair; scales brown or dark brown. 55. Pinnae prominently stipitate(stipes usually more than 2 mm long), alternate, except the basal pair subopposite; the narrow wing margins of costa or the sinus between lobes glabrous, rarely sparsely pubescent; indusia margin subentire or erose(Ser. 3. Mackinnoniana Z. R. Wang). 7 species included. 56. The narrow wing margins of costae glabrous, raches and costae glabrous or sparsely pubescent. 57. Pinnules oblong, rotund-obtus at apex. In Zhejiang and Anhui ...... ...... 53. A. intermixtum Ching et P. S. Chiu 57. Pinnules ovate to oblong-lanceolate acute at apex. Lamina apex usually acuminate; raches and costae glabrous abaxially, pinnules of middle and lower pinnae pinnatipartite to pinnatisect. 59. Scales pale brown, linear-lanceolate, costae pale purplish red abaxially. In Sichuan 59. Scales dark brown, ovate to ovate-lanceolate, costae stramineous. In Xizang ....... 58. Lamina apex often cuspidate; raches and costae sparsely pubescent abaxially, pinnules of middle and lower pinnae pinnatilobate to pinnatipartite. 60. Costae pale purplish red; laminae thin herbaceous, prominently cuspidate at apex. In Henan, Anhui, Jiangxi, Zhejiang, Fujian, Taiwan, Hubei, Hunan, Guangxi, Sichuan, Guizhou, Yunnan, Shaanxi and Gansu ..... ...... 56. A. vidalii (Franch. et Sav.) Nakai 60. Costae stramineous; laminae papyraceus, often not prominently cuspidate at apex. In Hubei, Hunan, Guangxi, Sichuan, Guizhou, Yunnan, Shaanxi, Gansu and Xızang ...... 57. A. mackinnenii (Hope) C. Chr 56. The narrow wing margins of costae sparsely pubescent, costae densely pubescent abaxially. 61. Lamina suprasurface and lobe margin sparsely pubescent, pinnules long deltoid to deltoid-oblong, acute at apex. In Sichuan ....... 58. A. Iudingense Z. R. Wang et L. B. Zhang 61. Lamina suprasurface and lobe margin glabrous, pinnules oblong to deltoid ovate, obtuse at 

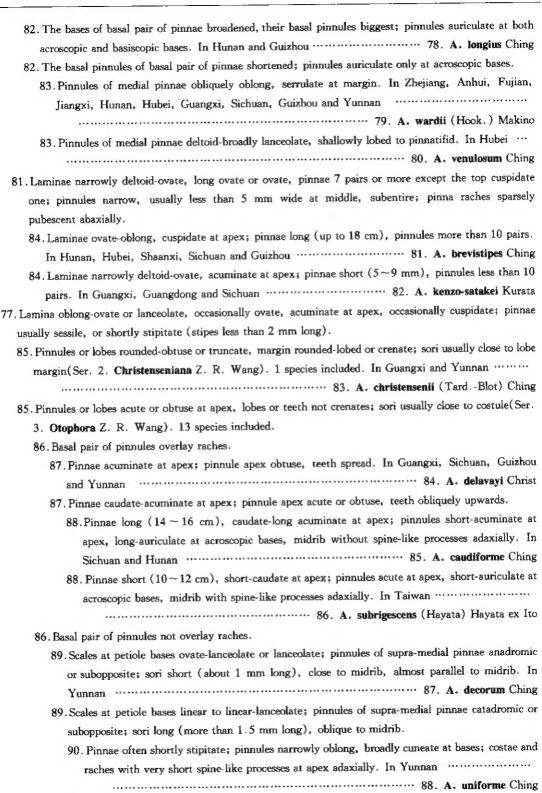
55. Pinnae usually sessile, occasionally shortly stipitate(stipes no more than 2 mm), basal 3 or more pairs often opposite or subopposite; the narrow wing margins of costa or the sinus between lobes



- Lamina suprasurface glabrous. 72 Pinnae and lobes small, pinnae less than 1 cm wide, lobes oblong, 2~3 mm wide, rounded truncate at apex; scales at petiole bases black in centre, prominently with narrow pale brown margin. In 72. Pinnae and lobes bigger, pinnae usually more than 2 cm wide, obtuse at apex; scales at petiole bases dark brown in centre, gradually pale towards margin. ...... 71. A. lineare Ching 73. Basal pinnules of pinnae often reflexed. In Yunnan 73. Pinnnles patent or ascendent. 74. Laminae bipinnate-pinnules pinnatisect to tripinnate-secondary pinnules pinnatilobate; basal pair of pinnae far bigger than the upper, oblong-ovate; costae and costules with short spine-74. Laminae pinnate-pinnae pinnatisect to bipinnate-pinnules pinnatilobate; basal pair of pinnae similar to or slightly shorter than the upper ones, narrowly lanceolate or narrowly oblanceolate; only the big pinnae with spine-like processes on their costules adaxially. 75. The bases of medial pinnae asymmetric; teeth at pinnule or lobe margin sharp and long. In Sichuan, Yunnan and Xizang ...... 73. A. austro-orientale Ching 75. The bases of medial pinnae nearly symmetric; teeth at pinnule or lobe margin short. In Sichuan, Guizhou, Yunnan and Xizang ...... 74. A. dubium Ching 44. Indusia usually short-linear or oblong, straight, lateral on veinlets, often close to midrib, at most those at lamina apex or acroscopic base of pinnule occasionally curved; scales at petiole bases often black or darkbrown (Sect. 14. Otophora Z. R. Wang). 2 subsections included. 76. Costae with subulate, short spine-like processes adaxially, costules or midribs without processes, occasionally with, but very short (Subsect. 1. Otophora Z. R. Wang). 3 series included. 77. Lamina broadly ovate or ovate, often cuspidate at apex, rarely long ovate, short acuminate at apex; pinnae usually prominently stipitate (stipes usually more than 2~3 mm long) (Ser. 1. Wardiana Z. R. Wang). 8 species included. 78. Pinnules of the basal 2~3 pairs of pinnae anadromic, pinnules prominently stipitate (stipes 3~5 mm long); raches and costae glabrous abaxially. In Anhui, Zhejiang, Taiwan, Hubei, Hunan, 78. Only the pinnules of basal pair of pinnae anadromic, pinnules of the rest pinnae subopposite or catadromic, shortly stipitate; raches and costae pubescent abaxially, rarely glabrate. 79. Pinnules lobed, lobes sometimes 1 mm long, or duplicto-dentate. In Guangxi ...... Pinnules subentire or serrate or lobed. 80. Pinnules lanceolate to narrowly lanceolate, length 3 or more times as long as width; sori
  - 80. Pinnules deltoid, oblong-ovate or ovate, rarely long ovate, lengthless than 3 times as long as width; sori not parallel to midrib; indusia entire or subentire.

subparallel to midrib; indusia erose. In Shaanxi, Sichuan and Yunnan .....

81. Laminae deltoid or deltoid-ovate, pinnae about 5 pairs except the top cuspidate one; pinnules broad, usually more than 5 mm in width at the middle, serrate at margin; costae densely pubescent abaxially.



90. Pinnae sessile or very shortly stipitate; pinnules not narrowly oblong, cuneate at basiscopic

- bases, truncate and parallel to costae at acroscopic bases; spine-like processes at the apex of costae and raches at apex on adaxial surface prominent.
- 91. Laminae narrowly ovate or lanceolate, acuminate at apex.
  - 92. Costules prominently with spine-like processes adaxially; raches and costae densely pubescent or glabrous abaxially.
  - 92. Costules without or with very short spine-like processes adaxially; raches and costae densely pubescent abaxially.
- 91. Laminae ovate or deltoid-ovate, occasionally long ovate, slightly cuspidate or short acuminate at apex.
  - 95. Raches and costae glabrous abaxially; pinnae sessile.
    - 96. Basal pair of pinnae narrowly lanceolate, acroscopic pinnules of costae almost equal in lenth with the basiscopic ones. In Hubei, Hunan, Anhui, Zhejiang, Fujian, Guangdong, Guangxi, Sichuan, Guizhou, Yunnan and Taiwan ............................... 93. A. otephorum (Miq.) Koidz.
  - 95. Raches and costae pubescent abaxially; pinnae shortly stipitate.
    - 97. Spine-like processes of raches and costae short, sparsely sparsely glandular pubescent abaxially; pinnules separate, short obtuse at apex. In Taiwan ..... 95. A. arisanense (Hayata) Tagawa
    - 97. Spine-like processes of raches and costae long, densely with pale brown short glandular hairs abaxially; pinnules densely closed, acute at apex. In Yunnan ........ 96. A. caudatum Ching
- 76. Costae and costules with long needle-like processes adaxially, ultimate lobes midrib often with processes as well(Subsect. 2. Strigillosa (Ching et Y. T. Hsieh) Z. R. Wang). 4 series included.
  - Laminae tripinnate or more divided; secondary pinnules prominently stipitate; raches and costae glabrous abaxially(Ser. 1. Rhachidosora Z. R. Wang).
     species included.

    - 99. Laminae elliptic; ultimate lobes slender and long, linear or long subulate, usually about 1 mm wide.
      100. Ultimate lobes linear, ascendent; sori closely along both sides of costules, straight. In
      - Sichuan, Yunnan and Xizang ...... 98. A. rhachidosorum (Hand.-Mazz.) Ching
  - 98. Laminae pinnate to bipinnate; pinnules at most pinnatifid; raches and costae pubescent or glabrous abaxially.

- 101. Sori oblong or short-linear, straight, close to midribs of pinnules or lobes, often partly overlap them when ripe; raches and costae glabrous abaxially, at most slightly pubescent at bases of costae(Ser. 2. Fangiana Z. R. Wang). 7 species included.
  - 102. Small plants (fronds less 25 cm long), laminae narrowly deltoid or deltoid-ovate(three species under this item, as to the species A. chingianum Z. R. Wang et X. C. Zhang with long-reeping rhizomes, laminae glabrous on suprasurface, see item 6); laminae suprasurface glandular-pubescent.
  - 102. Middle-sized plants (fronds more than 30 cm long), laminae broadly ovate to linear-lanceolate; lamina suprasurface glabrous.

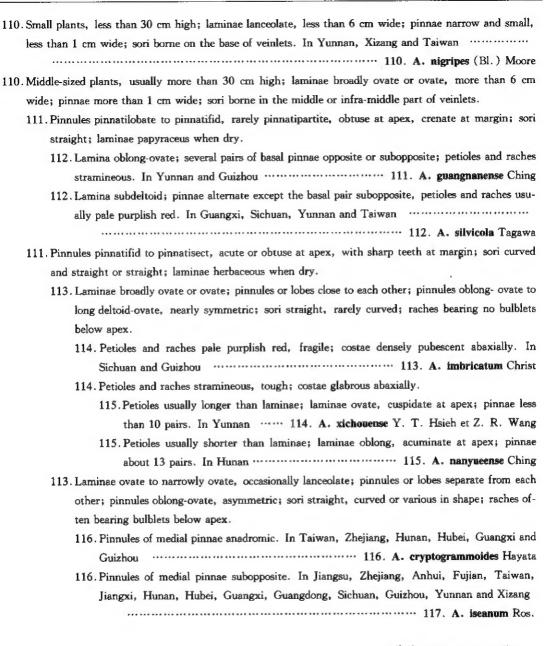
    - 104. Laminae bipinnate; pinnae lanceolate or linear-lanceolate,  $5\sim20$  cm long, pinnules separate from each other.

      - 105. Laminae broadly ovate to ovate; ultimate lobe margin prominently with long or short teeth.

        - 106. Pinnae 6~7 pairs; pinnules obovate or oblong; raches and costae densely pubescent abaxially. In Yunnan ....... 106. A. yuanyangense Y. T. Hsieh et W. M. Chu
- 101. Sori curved or straight, not close to midribs of pinnules or lobes, not overlap them when ripe; raches and costae pubescent abaxially, rarely glabrous.
  - 107. Laminae lanceolate to linear-lanceolate; pinnae usually more than 18 pairs; raches usually bearing bulblets below the apex(Ser. 3. Strigillosa Z. R. Wang). 3 species included.

    - 108. Laminae lanceolate to narrowly lanceolate; only 1~2 pairs of basal pinnae slightly shortened; pinnae long (6~11 cm long), usually shortly stipitate, lobes more than 10 pairs, biserrate or lobed at margin; bulblets of raches small.
      - 109. Pinnules deltoid-broadly lanceolate; lobes only with minute teeth. In Hunan, Jiangxi, Guangdong, Guangxi, Sichuan, Guizhou and Yunnan ...... 108. A. viviparum Christ
      - 109. Pinnules ovate-oblong; lobes with about 1 mm long sharp teeth. In Hunan, Jiangxi, Guangdong, Guangxi, Sichuan, Guizhou, Yunnan, Xizang and Taiwan

107. Laminae broadly ovate, ovate or lanceolate; pinnae less than 15 pairs; raches unusually bearing bulblets below apex(Ser. 4. Iseana Z. R. Wang). 8 species included.



(待续. To be continued)